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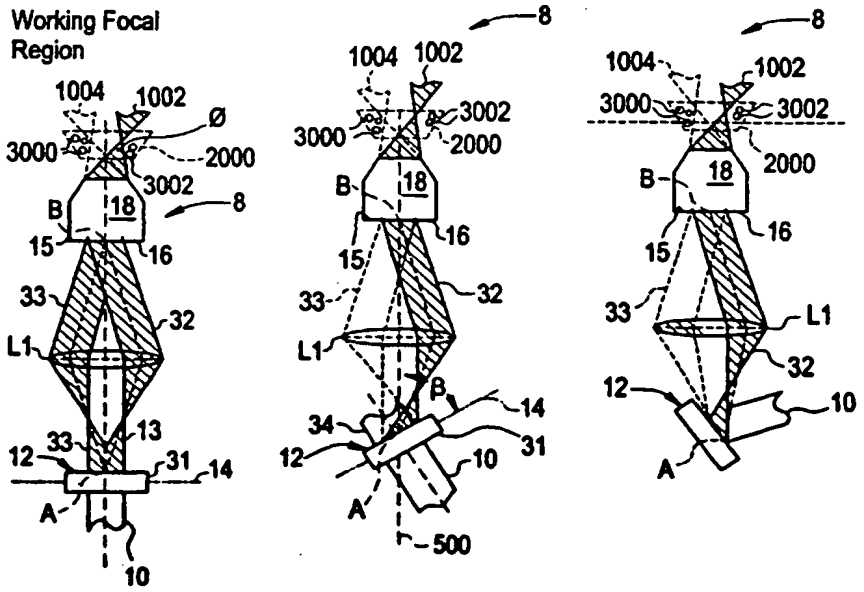
(54) Title: IMPROVED APPARATUS, SYSTEM AND METHOD FOR APPLYING OPTICAL GRADIENT FORCES



(57) Abstract: The present invention relates generally to generating and controlling optical trap arrays for manipulating particles. In particular, the invention relates to a dual function optical element able to both diffract laser light into beamlets and converge the beamlets (acting as a virtual lens for laser light), thereby eliminating the need for multiple physical lenses to transfer the diffracted laser beams to a focusing lens. The invention also relates to improved monitoring of optical traps by limiting the amount of noise reflected and scattered resulting from un-diffracted, laser light.

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